



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/565,504

12/21/2006

Kazumasa Ikushima

062005

9554

38834

7590

08/20/2008

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER

LEGESSE, HENOK D

ART UNIT

PAPER NUMBER

2861

MAIL DATE

DELIVERY MODE

08/20/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,504	IKUSHIMA, KAZUMASA	
	Examiner	Art Unit	
	HENOK LEGESSE	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>1 Foreign Refer(JP2003126750)</u> |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/30/2008 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Suovaniemi et al. (US 5,343,769).

Regarding claim 1, Suovaniemi et al teaches a method of discharging a liquid droplet comprising:

providing a liquid discharging apparatus (device in figs.1, 2, 4) comprising:

a metering tube (6 in fig.2) having a discharge port communicating to outside (fig.2), and

a plunger (4) which is in close contact with the inner wall surface of the metering tube (6)(see in fig.2);

moving forward and stopping the plunger (4), over a plurality of times during a forward movement process of the plunger (See figs.2-5, controller 13 controls the movement of plunger 4 i.e. in a forward movement of the plunger 4, the plunger discharges fluid, and during forward movement of the plunger 4, the plunger starts to move, it accelerates, it moves at a constant speed, it decelerates, and it stops over predetermined time as shown in fig.5 under the control of the controller 13. See also col.4, lines 36-68; col.5, lines 1-3); and

controlling moving speed (using the controller 13 in fig.4) of the plunger (4, fig.2) from a start of the deceleration to a stop of the plunger (4) in the steps of moving forward and stopping the plunger (4) such that a discharge quantity of the liquid droplet discharged from the discharge port becomes constant at every discharge (fig.5; col.5, lines 47-50, 59-68 during liquid dispensing initially the driving motor 8 is accelerated over time thereby the plunger 4, step A, up to a desired level B and this level B is maintained over a period of time up to point C at this point the motor 8 decelerates thereby the plunger 4 until the plunger stops over given time to discharge a given amount of fluid as shown in fig.5), wherein the liquid material in the metering tube (6) is discharged from the discharge port over a plurality of times during the forward movement process of the plunger (4)

Art Unit: 2861

(as shown in figs.2-5, during the forward movement of the plunger 4 under the control of controller 13 liquid is discharged from the discharge port over the times of acceleration, constant speed movement, and deceleration).

Regarding claim 3, Suovaniemi et al further teaches the liquid droplet discharged /dispensed by the method of discussed in claims 1 above, inherently is dispensed on a droplet receiving element/body/work.

Regarding claim 11, Suovaniemi et al further teaches wherein the step of controlling (see fig.4) moving speed of the plunger (plunger 4) comprises the steps of: a) starting and accelerating forward movement of the plunger (4) (fig.5; col.5, lines 47-50, 59-68 during liquid dispensing initially the plunger starts to move and accelerates as shown by step A in fig.5 under the control of controller 13 in fig.4); b) keeping the forward movement of the plunger (4) at a constant speed (step B in fig.5); c) decelerating and stopping the plunger (4) (step C in fig.5), wherein the plunger (4) is moved by a regulated amount (regulated by controller 13 in fig.4).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been

Art Unit: 2861

obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, and 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suovaniemi et al.(US 5,343,769) in view of Fischer (US 6,283,946).

Regarding claim 5, Suovaniemi et al teaches an apparatus (device in figs.1, 2, 4) for discharging a liquid material, comprising:

a metering tube (6 in fig.2) having a discharge port communicating to outside (fig.2);

a plunger (4) which is in close contact with the inner wall surface of the metering tube (6)(see in fig.2);

a controller (controller 13 in fig.4) controlling a forward movement process of the plunger, thereby discharging the liquid material in the metering tube (6) from the discharge port over a plurality of times during the forward movement process of the plunger (See figs.2-5, controller 13 controls the movement of plunger 4 i.e. in a forward movement of the plunger 4 the plunger discharges fluid, and during forward movement of the plunger 4, the plunger starts to move, it accelerates, it moves at a constant speed, it decelerates, and it stops over predetermined time as shown in fig.5 under the control of the controller 13. See also col.4, lines 36-68; col.5, lines 1-3), wherein the controller (13 in fig.4) controls a moving speed of the plunger (4) moving from a start of a deceleration to a stop of the plunger (4) in the steps of moving forward and stopping the

Art Unit: 2861

plunger (4) such that a discharge quantity of the liquid droplet discharged from the discharge port becomes constant at every discharge (see fig.5; col.5, lines 47-50 and lines 59-68).

Suovaniemi et al teaches the plunger (4) is in close contact with the inner wall surface of the metering tube (6), However, he does not specifically teaches the tip face of the plunger closely contacts with the inner wall surface of the metering tube.

However, Fischer teaches a plunger (250, figs.7A, 7B) whose tip face closely contacts the inner wall surface of the metering tube (220). A sealing gasket (260) is arranged on the tip portion of the plunger (250) to improve the closeness of the plunger tip to the inner surface of the tube (220).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the sealing gasket of Fischer on the tip portion of the plunger of Suovaniemi et al in order to improve the closeness of the plunger to the inner surface of the tube thereby improving the efficiency of the dispensing device, since air and/or liquid is hindered from passing between the inner surface of tube and the plunger.

Regarding claim 2, Fischer further teaches air bubble removing means, air vent, can be provided in the plunger to vent out trapped air bubbles (col.13, lines 6-8).

Regarding claim 6, Suovaniemi et al further teaches input device (detector 14 in fig.4 which includes sensors 23 and 24 in fig.3 of Suovaniemi et al) indicating the moving speed of the plunger (4 in fig.2, col.4, lines 40-44) moving forward from start of deceleration to stop to the controller (13 in fig.4) (detector 14 including sensors 23,24 measures the position and / or movement of plunger 14, col.3 lines 59-61. see also figs.4, 5 and the corresponding text).

Regarding claim 7, Suovaniemi et al further teaches the controller (13, in fig.4 of Suovaniemi et al) controls the operation of the plunger (4 in fig.2) on the basis of data concerning the moving speed of the plunger (4) moving forward from start of deceleration to stop, which has been inputted by the input means (14, 23, 24 figs.3, 4) (col.4, lines 18-68).

Regarding claims 8 and 10, Suovaniemi et al further teaches wherein the plunger (4 in fig.2 of Suovaniemi et al) is moved by a motor (electric motor 8, fig.3) and controlling moving speed of the plunger (4) by controlling a rotation of operation of the motor (8) (see fig.4, and the corresponding text).

Regarding claim 9, Suovaniemi et al as modified by Fischer above further teaches wherein the plunger (4 in fig.2 of Suovaniemi et al) having an air bubble removing means (plunger 4 of Suovaniemi et al as modified by the air vent of Fischer, see the rejection of claim 2 above).

Art Unit: 2861

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suovaniemi et al.(US 5,343,769) in view of Horsnell et al. (US 2005/0231553).

Regarding claim 12, Suovaniemi et al teaches substantially the claimed inventions (see the rejections of claims 1 and 11 above).

Suovaniemi et al does not explicitly teaches method of discharging a liquid droplet including a step of a) starting and accelerating forward movement of the plunger; b)decelerating and stopping the plunger without keeping the forward movement at a constant speed, wherein the plunger is moved by a regulated amount.

However, from the same endeavor Horsnell et al teaches method of discharging a liquid droplet (figs.1,5,10,16) including a step of a) starting and accelerating forward movement of the plunger (due to the application of the first portion of the driving wave forms in figs.16a,16b); b) decelerating and stopping the plunger without keeping the forward movement at a constant speed, wherein the plunger is moved by a regulated amount (due to the application of the second portion of the driving wave forms in figs.16a,16b, and the movement of the plunger such as 1 in fig.1 is controlled by controller in figs.10,16. see also paragraph 0165).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to drive the liquid discharging device of Suovaniemi et al to have the above claimed ejection steps by providing the

Art Unit: 2861

driving signals of Horsnell et al in order to be able to small ejections will suppressing the formation of satellite droplets.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Osawa et al (US 2001/0016358), Sato (US 6,230,606), Eslinger (US 4,990,058), Moler et al. (US 7,021,191), Hanafusa et al. (US 2006/0144331), Ikushima (JP 2003126750).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HENOK LEGESSE whose telephone number is (571)270-1615. The examiner can normally be reached on Mon.- Fri. Between. 8:00 AM-6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MATTHEW LUU can be reached on (571)272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2861

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LUU MATTHEW/
Supervisory Patent Examiner, Art Unit 2861

H.L.
08/15/2008